

Amendment to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (Currently amended) A method of forming a ~~polymer-biomacromolecule~~ conjugate with one or more polymers linked to a single biomolecule comprising a radical based reaction of a monomers with one or more user established polymerization initiation sites on ~~a each~~ biomacromolecule or one or more user established sites on the each biomacromolecule specifically modified by the user to include polymerization initiation sites, said method resulting in a each polymer-biomacromolecule conjugate including comprising a single biomolecule with no more than one polymer chain attached to each of the one or more initiation sites and where each polymer chain is attached only at one end of the polymer chain to that single biomolecule ~~attached to one or more polymer chains.~~
2. (Previously presented) The method of claim 1 wherein the one or more polymerization initiation sites or one or more sites on the biomacromolecule modified to include polymerization initiation sites comprise natural or non-natural amino acids.
3. (Original) The method of claim 2 wherein the biomacromolecule is a protein.
4. (Previously presented) The method of claim 3 wherein the amino acid is modified by a protein modifying initiator or a protein modifying initiator is added to the protein to provide an initiator site, or an artificially created initiator amino acid is formed on the protein, or recombinant proteins are generated to include artificial amino acids containing an initiator fragment.

5. (Original) The method of claim 1 further including removing the unreacted monomer or non-bonded polymer to obtain a purified biomolecule-polymer conjugate.

6. (Currently Amended) The method of claim 4 wherein a non-interacting initiator which does not bind to the protein is added along with the initiator modified protein ~~modifying initiator~~ and the polymer grown from non-interacting initiator is not covalently bound to the protein.

7. (Previously presented) The method of claim 6 wherein a purified protein-polymer conjugate is obtained by removing any unreacted monomer or the non-covalently bound polymer grown from non-interacting initiator.

8. (Currently amended) A method of forming a protein-polymer conjugate comprising modifying ~~the a~~ protein to include initiator sites and reacting the modified protein with a monomer to form the protein-polymer conjugate comprising a single protein ~~attached to~~ with one or more polymer chains attached thereto and each polymer chain conjugated with a single protein.

9. (Currently amended) A method of forming a protein-polymer conjugate comprising modifying a protein to have one or more user established polymerization initiator sites suitable for initiation of radical polymerization and reacting the modified protein with monomer to form a conjugate with the protein, said conjugate comprising a polymer chain propagating from the initiator site, said polymer chain conjugated with only a single protein.

10. (Original) The method of claim 9 wherein the protein is modified to have bromoisobutyrate functionality and the conjugate is formed using atom transfer radical polymerization.

11. (Previously presented) The method of claim 9 further including increasing the amount of reactive sites available to form user established polymerization sites by chemically creating in the protein one or more free thiol sites available for conjugation of the initiator.

12. (Currently amended) The method of claim 11 wherein the protein is reduced with tris-(2-carboxyethyl) phosphine hydrochloride to produce additional thiols on the protein for conjugation, modifying the protein by reacting with a pyridyl disulfide initiator, capping any unmodified thiols to form a macroinitiator and reacting the macroinitiator with a monomer with or without the presence of a 2-bromoisobutyrate functionalized resin to form the protein-polymer conjugate.

13. (Original) The method of claim 9 wherein the monomer and protein are reacted to form a conjugate including poly(N-isopropylacrylamide) or poly(ethylene glycol) methyl ether methacrylate.

14. (Original) The method of claim 9 comprising modifying the protein by reacting it with propylmercapto-pyridine 2-bromoisobutyrate and then forming a conjugate by reacting with N-isopropylacrylamide.

15. (Previously presented) A method of forming a protein-polymer conjugate comprising modifying a protein to have functionality suitable for initiation of radical polymerization and reacting the modified protein with a monomer comprising:

modifying the protein by interacting with a bromoisobutyrate-modified ligand initiator, mixing said protein modified by the bromoisobutyrate-modified ligand initiator with a non-interacting bromoisobutyrate-modified solid phase resin and adding to said mixture a suitable reactive monomer under conditions suitable to initiate polymerization of the protein modified by the bromoisobutyrate-modified ligand initiator with the monomer to form the protein-polymer conjugate.

16. (Original) The method of claim 15 wherein the initiator is a bromoisobutyrate-modified biotin initiator.

17. (Original) The method of claim 15 wherein the protein is streptavidin.

18. (Original) The method of claim 15 wherein the monomer is N-isopropylacrylamide.

19. (Original) The method of claim 15 wherein the monomer is (ethylene glycol) methyl ether methacrylate.

20. (Currently amended) A protein-polymer conjugate comprising a single protein with initiator-modified locations thereon, ~~protein bound to~~ one or more polymer chains bound to the protein with the each initiator-modified location forming as a link between the single protein and ~~the one or more a single polymer chains~~ chain, the protein-polymer conjugate formed by reacting the initiator-modified locations on the protein each with a monomer and polymerizing to form the conjugate.

21. (Original) The method of claim 2 wherein the biomacromolecule is an enzyme.

22. (Original) The method of claim 21 wherein the enzyme is lysozyme.

23. (Original) The method of claim 2 wherein the biomacromolecule is an antibody.